THE EFFECT OF PLANT DENSITY AND TOPPING METHODS ON COTTON YIELD.

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Abstract. This article examines the yield indices of fine-fiber cotton varieties. The productivity coefficient, yield coefficient, and cotton yield are considered.

Keywords. Growth, development, cotton plant, shoot thickness, yield indices, yield coefficient.

ВЛИЯНИЕ ГУСТОТЫ РАСТЕНИЙ И МЕТОДОВ ПРИЩИПЫВАНИЯ НА УРОЖАЙНОСТЬ ХЛОПЧАТНИКА

Аннотация. В данной статье изучены показатели урожайности тонковолокнистого сорта хлопчатника. Рассмотрены коэффициент продуктивности, коэффициент урожайности и урожайность хлопка.

Ключевые слова. Рост, развитие, растение хлопчатника, толщина всходов, показатели урожайности, коэффициент урожайности.

According to available data, cotton serves as a source of income and livelihood worldwide and is cultivated on 32 million hectares across 100 countries. Although the cultivated area has remained unchanged over the past 60 years, productivity has continued to increase. Cotton is grown in nearly 80 countries, accounting for only 2.5% of global cropland. From August 2017 to July 2018, the global cotton production value was estimated at approximately 50 billion USD [10].

N. Mahmudov studied the effect of plant density on the boll-setting process of the cotton varieties "Sulton" and "O'zPITI-201" under the conditions of the Andijan region. The highest results were obtained in the 90×12–1 planting system when plant density was 95 thousand plants per hectare for the "Sulton" variety and 110 thousand plants per hectare for the "O'zPITI-201" variety.

Research conducted by I. Bo‘riev and B. Tillabekov in the typical gray soils of the Kashkadarya region examined the influence of plant density on the technological properties of fiber in medium-fiber cotton varieties Namangan-77, Bukhara-6, S-6530, and Mehr. As plant density increased from 90 thousand to 120 thousand plants per hectare, positive effects on the technological properties of cotton fiber were observed, although fiber yield decreased slightly. Additionally, I. Bo‘riev [3] recommended a plant density of 120 thousand plants per hectare for obtaining high cotton yields (36.8, 38.2, 37.4, and 38 centners/ha for the respective varieties) and producing high-quality fiber from the Namangan-77, Bukhara-6, S-6530, and Mehr varieties.S. According to the experiments conducted by Rahmonqulov et al., when soil moisture was maintained at 65–70–65% of ChDNS and irrigation was applied accordingly, cotton yield in variants with a plant density of 90–100 thousand plants per hectare was 4.9–6.5 centners/ha higher compared to variants where plant density was kept at 120–130 thousand plants per hectare [6].

In the studies of S. Boltaev et al., when the cotton variety “ST-1651” was irrigated using the 0-2-0 irrigation regime and mineral fertilizers were applied at N–230, P–160, K–115 kg/ha, yield reached 27.9 centners/ha at a plant density of 80–90 thousand plants/ha, whereas increasing the density to 110–120 thousand plants/ha resulted in a yield of 31.7 centners/ha [7,4,8].

In the experiments conducted by T. Rajabov under the soil conditions of the Kashkadarya region, when the “Bukhara-102” cotton variety was grown on soils with different salinity levels, plant density ranged from 85.0–85.7 thousand plants/ha on moderately saline soils, 81.3–82.8 thousand plants/ha on slightly saline soils, and 74.3–75.8 thousand plants/ha on moderately saline soils. By the end of the growing season, soil salinity decreased by 1.2%, 2.1%, and 2.2%, respectively.

According to I. Vasilchenko, the optimal plant density for the variety 108-F at a 70 cm row spacing is 100–120 thousand plants per hectare; exceeding this density negatively affects plant development.

Research conducted by R. H. Peebles, G. T. Den Harton, and others showed that in irrigated fields of the United States, cotton yield was higher when hill spacing at a 100 cm row distance was 5–15 cm, compared to wider spacings of 30–41 cm.

According to experimental data obtained in the takir meadow soils of Surkhandarya region in 2018–2020, the actual plant density of medium-fiber cotton varieties was 95.7–96.0 thousand plants/ha for a theoretical density of 90–100 thousand plants/ha, and 116.5–117.1 thousand plants/ha for 110–120 thousand plants/ha. For fine-fiber cotton, actual plant density averaged 124.5–124.8 thousand plants/ha for a theoretical density of 120–130 thousand plants/ha, and 146.7–146.9 thousand plants/ha for 140–150 thousand plants/ha. Differences between variants were not significant.

From thinning to harvest, due to adverse weather, pests and diseases, cultivation and hoeing operations, and mechanical damage during ridge formation, 3.5–5.5 thousand cotton plants per hectare were lost. According to end-of-season data, the final plant density of medium-fiber cotton was 92.3–92.5 thousand and 111.1–111.6 thousand plants/ha; for fine-fiber cotton, it was 120.6–120.9 thousand and 141.6–141.9 thousand plants/ha. Thus, compared to early-season densities, plant loss totaled 3.5–5.5 thousand plants/ha. Variants with higher initial plant density experiened slightly higher mortality.

Plant mortality increased with increasing plant density: losses rose by 1.7–2.0 thousand plants/ha as density increased. For example, in medium-fiber cotton, when theoretical plant density was 90–100 thousand plants/ha, plant loss by the end of the season was 3.5–3.7 thousand plants/ha, whereas at 110–120 thousand plants/ha, mortality increased to 5.3–5.5 thousand plants/ha.

Similarly, in fine-fiber cotton, plant loss ranged from 3.9–5.2 thousand plants/ha. For the “Surxon-103” variety, plant mortality was 3.9–4.0 thousand plants/ha at a theoretical density of 120–130 thousand plants/ha; increasing plant

density by 10–20 thousand plants/ha increased mortality by 1.0–1.3 thousand plants/ha, reaching 5.0–5.2 thousand plants/ha.

Thus, under the takir meadow soil conditions of Surkhandarya region, when medium- and fine-fiber cotton varieties are grown at optimal plant densities, their growth and development proceed normally, resistance to pests and diseases improves, and plant mortality by the end of the season is lower, ensuring higher cotton yields.

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